

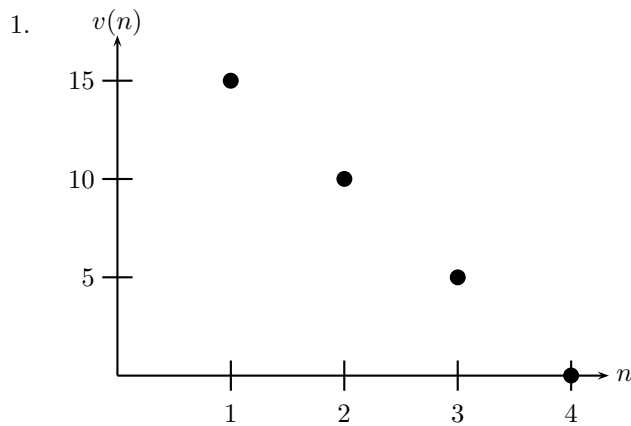
Name _____

Math 1
Exam 3

For all problems, show all work. You may use a graphing calculator. Do not round unless instructed otherwise. Good luck. ☺

Choose at least four of the first six problems. For the four problems that you choose, do all of the following:

- Determine if the sequence is arithmetic, geometric, or neither, and explain your reasoning.
- If a sequence is arithmetic or geometric, state its recursive form or its explicit form. (If one of these forms is given, you must determine the other form.)
- If a sequence is neither arithmetic nor geometric, do at least one of the following: Determine its recursive form, determine its explicit form, or explain the pattern of the sequence in words.



2. The population of Danville, IL was 35,000 in 1990, and it has decreased by 0.5% each year. (Thus, 99.5% of the population has remained in Danville, IL each year.)

3. $\left\{ \frac{-4}{7}, \frac{-1}{7}, \frac{2}{7}, \frac{5}{7}, \frac{8}{7}, \dots \right\}$

The instructions from the previous page (which apply to problems 4 through 6) are:

Choose at least four of the first six problems. For the four problems that you choose, do all of the following:

- Determine if the sequence is arithmetic, geometric, or neither, and explain your reasoning.
- If a sequence is arithmetic or geometric, state its recursive form or its explicit form. (If one of these forms is given, you must determine the other form.)
- If a sequence is neither arithmetic nor geometric, do at least one of the following: Determine its recursive form, determine its explicit form, or explain the pattern of the sequence in words.

4. $q(1) = 92$ and $q(n+1) = \frac{1}{2}q(n)$

5. $a(n) = 575 \left(\frac{-1}{5} \right)^n$

6.

n	$p(n)$
1	$\frac{1}{2}$
2	$\frac{1}{8}$
3	$\frac{1}{18}$
4	$\frac{1}{32}$

7. The ever popular store named *Candy Cavern* sold \$82,000 worth of candy in October of 2010. Each year after that, their October sales have increased by \$23,000. Determine a function that models the October sales of *Candy Cavern* and use it to predict their October sales in the year 2016.

8. Can you use the function from the previous problem to predict the sales of *Candy Cavern* in January of 2016? Explain thoroughly.

9. Consider the sequences $a(n) = 100n$ and $g(n) = 1.2^n$. Thus, the sequence $a(n)$ is $\{100, 200, 300, 400, \dots\}$ and the sequence $g(n)$ is $\{1.2, 1.44, 1.728, \dots\}$. Is $a(n)$ bigger than $g(n)$ for every value of n ? Explain thoroughly.

10. Klutzy Kyle had written down a sequence, but he spilled coffee all over his paper. He can tell from looking at his paper that the first term of the sequence was 4 and the fifth term was 324. Klutzy Kyle remembers that the sequence was either arithmetic or geometric, but he is too distraught about the spilled coffee and the destroyed work to recreate the sequence correctly. Perhaps if someone recreated Klutzy Kyle's sequence, he will remember it. Determine all sequences that are either arithmetic or geometric that have a first term of 4 and a fifth term of 324.